

What is claimed is:

1 1. A digital broadcasting apparatus which achieves simulated
2 interaction using a digital broadcast, the digital
3 broadcasting apparatus comprising:

4 image information storage means for storing a
5 plurality of sets of image data, each of which has an image
6 data identifier;

7 , control information storage means for storing a
8 plurality of sets of control information, each of which has
9 a control information identifier, and each of which includes
10 link destination information that shows a set of image data
11 and a set of control information for a link destination for
12 a corresponding set of image data; and

13 transmission means for repeatedly transmitting a
14 plurality of sets of the image data and a plurality of sets
15 of the control information.

1 2. A digital broadcasting apparatus which achieves simulated
2 interaction using a digital broadcast, the digital
3 broadcasting apparatus comprising:

4 image information storage means for storing a
5 plurality of sets of image data, each of which has an image
6 data identifier;

7 control information storage means for storing a
8 plurality of sets of control information, each of which has
9 a control information identifier, and each of which includes

10 link destination information that shows a set of image data
11 and a set of control information for a link destination for
12 a corresponding set of image data; and

13 multiplexing transmission means for repeatedly
14 transmitting a plurality of sets of the image data and a
15 plurality of sets of the control information as a
16 multiplexed stream.

1 3. The digital broadcasting apparatus of Claim 2, further
2 comprising correspondence information storage means for
3 storing correspondence information showing correspondence
4 between the sets of image data and the sets of control
5 information,

6 wherein the multiplexing transmission means includes:
7 a retrieval unit for retrieving a set of image data
8 and a corresponding set of control information shown in the
9 correspondence information; and

10 a multiplexing unit for successively multiplexing
11 image data and control information retrieved by the
12 retrieval unit.

1 4. The digital broadcasting apparatus of Claim 3, wherein
2 the link destination information shows a combination of an
3 image data identifier of the set of the image data for the
4 link destination and a control information identifier of a
5 corresponding set of control information for the link

6 destination.

1 5. The digital broadcasting apparatus of Claim 4, wherein
2 the multiplexing unit, when multiplexing a set of image data
3 and a set of control information, assigns and writes first
4 image data identification information into the set of image
5 data and control information identification information into
6 the set of control information.

1 6. The digital broadcasting apparatus of Claim 2, wherein at
2 least one set of control information includes supplementary
3 image information which is used to select a set of image
4 data for a link destination indicated by the link
5 destination information.

1 7. The digital broadcasting apparatus of Claim 2, wherein at
2 least one set of control information includes script
3 information for supporting an interactive function performed
4 by a reception apparatus which receives the digital
5 broadcast.

1 8. The digital broadcasting apparatus of Claim 2, further
2 comprising entry information storage means for storing entry
3 information which shows a combination of a set of image data
4 and a set of control information which are to be reproduced
5 first for a program,

6 wherein the multiplexing transmission means repeatedly
7 transmits the entry information.

1 9. A digital broadcasting apparatus which achieves simulated
2 interaction using a digital broadcast, the digital
3 broadcasting apparatus comprising:

4 image information storage means for storing a
5 plurality of sets of image data, each of which has an image
6 data identifier;

7 control information storage means for storing a
8 plurality of sets of control information, each of which has
9 a control information identifier, and each of which includes
10 link destination information that shows a set of image data
11 and a set of control information for a link destination for
12 a corresponding set of image data, the link destination
13 information showing a combination of an image data
14 identifier of the set of the image data for the link
15 destination and a control information identifier for the set
16 of the control information;

17 correspondence information storage means for storing
18 correspondence information showing correspondence between
19 the sets of image data and the sets of control information;
20 and

21 multiplexing transmission means for repeatedly
22 transmitting a plurality of sets of the image data and a
23 plurality of the control information as a multiplexed

24 stream,

25 wherein the multiplexing transmission means includes:

26 a retrieval unit for retrieving a set of image data

27 and a corresponding set of control information shown in the

28 correspondence information;

29 a multiplexing unit for successively multiplexing

30 image data and control information retrieved by the

31 retrieval unit, in doing so assigning and writing first

32 image data identification information into the set of image

33 data and control information identification information into

34 the set of control information,

35 an image correspondence table generation unit for

36 generating an image correspondence table for each set of

37 image data, each image correspondence table being given

38 identification information found from the image data

39 identifier of the corresponding set of image data, each

40 image correspondence table including second image data

41 identification information specifying a corresponding set of

42 image data; and

43 an image correspondence table multiplexing unit for

44 reading an image correspondence table corresponding to a set

45 of image data and multiplexing the image correspondence

46 table such that the image correspondence table will be

47 transmitted by the multiplexing transmission means at a time

48 which precedes a transmission of the corresponding set of

49 image data by at least a predetermined time period, the

predetermined time period being defined as a time period which allows a digital broadcast reception apparatus which receives the digital broadcast to obtain the second image data identification information specifying a set of image data before starting to extract the corresponding set of image data.

10. The digital broadcasting apparatus of Claim 9, wherein the multiplexing transmission means further includes:

a retrieval control unit for controlling the retrieval unit to retrieve at least one set of image data which has first image data identification information that differs from the image data specified by second image data identification information included in the image correspondence table, during a time period between a multiplexing of the image correspondence table into the multiplexed stream by the image correspondence table multiplexing unit and a multiplexing of the set of image data corresponding to the image correspondence table.

11. The digital broadcasting apparatus of Claim 10, wherein the multiplexing unit includes a null data generation unit for generating, when a number of sets of image data stored in the image information storage means is less than a predetermined number, a number of sets of null data to make up the predetermined number, wherein the multiplexing unit

7 successively multiplexes the sets of null data generated by
8 the null data generation unit after a final set of image
9 data and a final set of control information have been read
10 by the retrieval unit.

1 12. The digital broadcasting apparatus of Claim 9, wherein
2 the multiplexing unit further includes an area assigning
3 unit for assigning, when a set of image data and a set of
4 control information are multiplexed, a bit rate to the set
5 of image data and to the corresponding set of control
6 information, each bit rate being determined in accordance
7 with a ratio of a data amount of each set of image data to
8 an information amount of the corresponding set of control
9 information,

10 wherein the multiplexing unit multiplexes the set of
11 image data and the set of control information using the
12 respective bit rates assigned by the area assigning unit.

1 13. The digital broadcasting apparatus of Claim 12, wherein
2 the multiplexing unit further includes a multiplexing start
3 position calculation unit for calculating multiplexing start
4 positions for when an image correspondence table, a set of
5 image data, and a set of control information are
6 multiplexed, using a predetermined equation,

7 the image correspondence table multiplexing unit
8 multiplexing an image correspondence table starting at the

9 multiplexing start position calculated by the multiplexing
10 start position calculation unit, and
11 the multiplexing unit multiplexing a set of image data
12 and a set of control information at the respective
13 multiplexing start positions calculated by the multiplexing
14 start position calculation unit.

1 14., The digital broadcasting apparatus of Claim 9, wherein
2 the first image data identification information and the
3 second image data identification information are the same.

1 15. The digital broadcasting apparatus of Claim 9, wherein
2 the first image data identification information and the
3 second image data identification information are
4 combinations of a stream identifier ("stream_id") and a
5 packet identifier ("PID") in accordance with MPEG2 (Moving
6 Pictures Experts Group2) standard.

1 16. The digital broadcasting apparatus of Claim 9, wherein
2 the first image data identification information is a
3 combination of a stream identifier ("stream_id") and a
4 packet identifier ("PID") in accordance with MPEG2 (Moving
5 Pictures Experts Group2) standard, and the second image data
6 identification information is a combination of a stream
7 identifier in accordance with MPEG2 (Moving Pictures Experts
8 Group2) standard and a component tag ("component_tag") in

9 accordance with DVB (Digital Video Broadcasting) standard,
10 wherein the multiplexing transmission means repeatedly
11 transmits a correspondence table for the packet identifier
12 and the component tag.

1 17. The digital broadcasting apparatus of Claim 9, wherein
2 the multiplexing transmission means further includes an
3 image data identifier appending unit for writing, when a set
4 of image data retrieved by the retrieval unit is
5 multiplexed, an image data identifier into a private area of
6 the corresponding set of image data.

1 18. The digital broadcasting apparatus of Claim 9, wherein
2 the image correspondence table multiplexing unit, after
3 multiplexing an image correspondence table, multiplexes the
4 same image correspondence table a plurality of times before
5 a set of image data which corresponds to the image
6 correspondence table is multiplexed.

1 19. A digital broadcasting apparatus which achieves
2 simulated interaction using a digital broadcast, the digital
3 broadcasting apparatus comprising:

4 image information storage means for storing a
5 plurality of sets of image data, each of which has an image
6 data identifier;

7 audio information storage means for storing a

8 plurality of sets of audio data, each of which has an audio
9 data identifier;

10 control information storage means for storing a
11 plurality of sets of control information, each of which has
12 a control information identifier, and each of which includes
13 link destination information that shows a set of image data,
14 a set of audio data, and a set of control information for a
15 link destination for the corresponding set of image data;
16 and

17 multiplexing transmission means for repeatedly
18 transmitting a plurality of sets of the image data, a
19 plurality of sets of audio data, and a plurality of the
20 control information as a multiplexed stream.

21 20. The digital broadcasting apparatus of Claim 19, further
22 comprising:

3 correspondence information storage means for storing
4 correspondence information showing correspondence between
5 the sets of image data, the sets of audio data, and the sets
6 of control information,

7 wherein the multiplexing transmission means includes:

8 a retrieval unit for retrieving a set of image data
9 and a corresponding set of audio data and a corresponding
10 set of control information shown in the correspondence
11 information; and

12 a multiplexing unit for successively multiplexing

13 image data, audio data and control information retrieved by
14 the retrieval unit.

1 21. The digital broadcasting apparatus of Claim 20, wherein
2 the link destination information shows a combination of an
3 image data identifier for the set of image data of a link
4 destination, an audio data identifier for the set of audio
5 data of the link destination, and a control information
6 identifier for the control information of the link
7 destination.

1 22. The digital broadcasting apparatus of Claim 4, wherein
2 the multiplexing unit, when multiplexing a set of image
3 data, a set of audio data, and a set of control information,
4 assigns and writes first image data identification
5 information into the set of image data, first audio data
6 identification information into the set of audio data, and
7 control information identification information into the set
8 of control information.

1 23. The digital broadcasting apparatus of Claim 22, wherein
2 the multiplexing transmission means further includes:
3 an image correspondence table generation unit for
4 generating an image correspondence table for each set of
5 image data, each image correspondence table being given
6 identification information found from the image data

7 identifier of the corresponding set of image data, each
8 image correspondence table including second image data
9 identification information specifying a corresponding set of
10 image data; and

11 an audio correspondence table generation unit for
12 generating an audio correspondence table for each set of
13 audio data, each audio correspondence table being given
14 identification information found from the audio data
15 identifier of the corresponding set of audio data, each
16 audio correspondence table including second audio data
17 identification information specifying a corresponding set of
18 audio data;

19 an image correspondence table multiplexing unit for
20 reading an image correspondence table corresponding to a set
21 of image data and multiplexing the image correspondence
22 table such that the image correspondence table will be
23 transmitted by the multiplexing transmission means at a time
24 which precedes a transmission of the corresponding set of
25 image data by at least a predetermined time period, the
26 predetermined time period being defined as a time period
27 which allows a digital broadcast reception apparatus which
28 receives the digital broadcast to obtain the second image
29 data identification information specifying a set of image
30 data before starting to extract the image data; and

31 an audio correspondence table multiplexing unit for
32 reading an audio correspondence table corresponding to a set

33 of audio data and multiplexing the audio correspondence
34 table such that the audio correspondence table will be
35 transmitted by the multiplexing transmission means at a time
36 which precedes a transmission of the corresponding set of
37 audio data by at least a predetermined time period, the
38 predetermined time period being defined as a time period
39 which allows a digital broadcast reception apparatus which
40 receives the digital broadcast to obtain the second audio
41 identification information specifying a set of audio data
42 before starting to extract the audio data.

1 24. A digital broadcasting apparatus which achieves
2 simulated interaction using a digital broadcast, the digital
3 broadcasting apparatus comprising:

4 image information storage means for storing a
5 plurality of sets of image data, each of which has an image
6 data identifier;

7 control information storage means for storing a
8 plurality of sets of control information, each of which has
9 a control information identifier, and each of which includes
10 link destination information that shows a set of image data
11 and a set of control information for a link destination for
12 the sets of image data, the link destination information
13 showing a combination of an image data identifier of the set
14 of the image data for the link destination and a control
15 information identifier for the set of control information;

16 correspondence information storage means for storing
17 correspondence information showing correspondence between
18 the sets of image data and the sets of control information;
19 and

20 multiplexing transmission means for repeatedly
21 transmitting a plurality of sets of the image data and a
22 plurality of the control information as a multiplexed
23 stream,

24 wherein the multiplexing transmission means includes:
25 a retrieval unit for retrieving a plurality of sets of
26 image data and corresponding sets of control information
27 shown in the correspondence information;

28 a multiplexing unit for successively multiplexing
29 image data and control information retrieved by the
30 retrieval unit, in doing so assigning and writing first
31 image data identification information into the set of image
32 data and control information identification information into
33 the set of control information;

34 an image correspondence table generation unit for
35 generating an image correspondence table for each set of
36 image data, each correspondence table having identification
37 information found from the image data identifier of the
38 corresponding set of image data, each image correspondence
39 table including second image data identification information
40 specifying a corresponding set of image data and
41 reproduction time information for the corresponding set of

42 image data; and
43 an image correspondence table multiplexing unit for
44 reading an image correspondence table corresponding to a set
45 of image data and multiplexing the image correspondence
46 table such that the image correspondence table will be
47 transmitted by the multiplexing transmission means at a time
48 which precedes a transmission of the corresponding set of
49 image data by at least a predetermined time period, the
50 predetermined time period being defined as a time period
51 which allows a digital broadcast reception apparatus which
52 receives the digital broadcast to obtain the second image
53 data identification information specifying a set of image
54 data before starting to extract the image data.

1 25. The digital broadcasting apparatus of Claim 24, wherein
2 the image correspondence table generation unit includes:

3 a reproduction time calculation unit for calculating
4 reproduction time information at which a set of image data
5 corresponding to an image correspondence table is to be
6 reproduced, in accordance with a predetermined equation; and

7 a reproduction time writing unit for writing the
8 reproduction time information calculated by the reproduction
9 time calculation unit into the image correspondence table.

1 26. A digital broadcasting apparatus which achieves
2 simulated interaction using a digital broadcast, the digital

3 broadcasting apparatus comprising:

4 image information storage means for storing a
5 plurality of sets of image data, each of which has an image
6 data identifier;

7 control information storage means for storing a
8 plurality of sets of control information, each of which has
9 a control information identifier, and each of which includes
10 link destination information that shows a set of image data
11 and a set of control information for a link destination for
12 the sets of image data, the link destination information
13 showing a combination of an image data identifier of the set
14 of the image data for the link destination and a control
15 information identifier for the control information;

16 correspondence information storage means for storing
17 correspondence information showing correspondence between
18 the sets of image data and the sets of control information;
19 and

20 multiplexing transmission means for repeatedly
21 transmitting a plurality of sets of the image data and a
22 plurality of the control information as a multiplexed
23 stream,

24 wherein the multiplexing transmission means includes:

25 a retrieval unit for retrieving a plurality of sets of
26 image data and corresponding sets of control information
27 shown in the correspondence information;

28 a multiplexing unit for successively multiplexing

29 image data and control information retrieved by the
30 retrieval unit, in doing so assigning and writing first
31 image data identification information into the set of image
32 data and control information identification information into
33 the set of control information;

34 a module information generation unit for generating a
35 set of module information for a plurality of sets of image
36 data, the module information including second image data
37 identification information for identifying each set of image
38 data in the plurality of sets of image data; and

39 a module information multiplexing unit for reading
40 module information generated by the module information
41 generation means and multiplexing the module information
42 such that the module information will be transmitted by the
43 multiplexing transmission means at a time which precedes a
44 transmission of the sets of image data, which are identified
45 by the second image data identification information in the
46 module information, by at least a predetermined time period,
47 the predetermined time period being defined as a time period
48 which allows a digital broadcast reception apparatus which
49 receives the digital broadcast to obtain the second image
50 data identification information specifying a set of image
51 data before starting to extract the corresponding set of
52 image data.

1 27. A digital broadcast reception apparatus for receiving a

2 repeatedly transmitted digital broadcast of a plurality of
3 sets of image data and sets of control information which
4 correspond to the sets of image data, each set of control
5 information including link destination information showing a
6 set of image data which is a link destination for a link
7 attached to a set of image data corresponding to the set of
8 control information,

9 the digital broadcast reception apparatus comprising:
10 reception means for receiving the digital broadcast;
11 extraction means for extracting one set of image data
12 and a corresponding set of control information from the
13 received digital broadcast;

14 storage means for storing the extracted set of control
15 information;

16 reproduction means for reproducing the extracted set
17 of image data;

18 operation means for receiving a user selection
19 operation of link destination information included in the
20 set of control information; and

21 extraction control means for controlling the
22 extraction means to extract a set of image data and a
23 corresponding set of control information which are indicated
24 by the link destination information selected by the user
25 selection operation.

1 28. The digital broadcast reception apparatus of Claim 27,

2 wherein each set of image data is appended with first image
3 data identification information and each set of control
4 information is appended with control information
5 identification information,

6 the operation means including an indication reception
7 unit for receiving an operation indicating a switching from
8 a currently displayed set of image data to a set of image
9 data for a link destination,

10 the extraction control means reading the link
11 destination information in the set of control information
12 stored in the storage means, and setting an extraction
13 condition for the extraction means based on an image data
14 identifier for a set of image data of the link destination
15 to which switching has been indicated by the indication
16 reception unit and a control information identifier for a
17 corresponding set of control information,

18 wherein each set of control information includes an
19 image data identifier for identifying a set of image data
20 for a link destination and a control information identifier
21 for identifying a set of control information for the link
22 destination as the link destination information,

23 and wherein the extraction means extracts a set of
24 image data and a set of control information according to the
25 extraction condition set by the extraction control means.

1 29. The digital broadcast reception means of Claim 28,

2 wherein the plurality of sets of image data and plurality of
3 sets of corresponding control information are transmitted
4 having been multiplexed into a multiplexed stream,

5 wherein the reproduction means includes a
6 supplementary image reproduction unit for combining
7 supplementary image information included in the control
8 information stored in the storage means with a set of image
9 data and reproducing the combined image, wherein the
10 supplementary image information includes a supplementary
11 image which is used to select a switching of image data from
12 a present set of image data to a link destination set of
13 image data.

14 30. The digital broadcast reception means of Claim 28,
15 wherein the plurality of sets of image data and plurality of
16 sets of corresponding control information are transmitted
17 having been multiplexed into a multiplexed stream, and each
18 set of control information includes script information for
19 supporting an interactive function,

20 wherein the reproduction means includes:

21 a script information interpreting unit for
22 interpreting script information; and

23 a script execution unit for executing scripts in the
24 script information, in accordance with an interpretation of
25 the script information interpreting unit.

1 31. The digital broadcast reception apparatus of Claim 28,

2 wherein the plurality of sets of image data and
3 corresponding sets of control information are transmitted
4 having been multiplexed into a multiplexed stream,

5 wherein entry information, showing an image data
6 identifier of a set of image data to be reproduced first
7 when the reproduction of the multiplexed stream is commenced
8 and a control information identifier of a set of control
9 information corresponding to the set of image data, is
10 multiplexed into the multiplexed stream,

11 wherein the extraction means includes an entry
12 information extraction unit for receiving an indication from
13 the extraction control means and extracting the entry
14 information,

15 wherein the storage means includes an entry
16 information storage unit for storing the entry information
17 extracted by the entry information extraction unit, and

18 wherein the extraction control means sets the
19 extraction condition in the extraction means based on the
20 image data identifier and the control information identifier
21 written in the entry information.

1 32. A digital broadcast reception apparatus for receiving a
2 repeatedly transmitted digital broadcast of a plurality of
3 sets of image data and sets of control information which
4 correspond to the sets of image data, each set of control

information including link destination information showing a set of image data which is a link destination for a link attached to a set of image data corresponding to the set of control information, each set of image data having first image data identification information, each set of control information having control information identification information, the plurality of sets of image data and corresponding sets of control information being multiplexed into a multiplexed stream and transmitted, the multiplexed stream including an image correspondence table for each set of image data, each image correspondence table including second image data identification information specifying a corresponding set of image data, each image correspondence table having identification information found from the image data identifier of the corresponding set of image data, the image correspondence tables being repeatedly transmitted in the same way as the sets of image data,

the digital broadcast reception apparatus comprising:
reception means for receiving the digital broadcast;
extraction means for extracting one set of image data and a corresponding set of control information from the received digital broadcast,

the extraction means including an image correspondence table extraction unit for extracting an image correspondence table with image correspondence table identification information which matches a set extraction condition;

31 storage means for storing the extracted set of control
32 information,

33 the storage means including an image correspondence
34 table storage unit for storing the extracted image
35 correspondence table;

36 reproduction means for reproducing an extracted set of
37 image data;

38 operation means for receiving user selection
39 operations for link destination information included in sets
40 of control information,

41 the operation means including an indication receiving
42 unit for receiving an indication for a switching from a set
43 of image data presently being reproduced to a set of image
44 data for a link destination; and

45 an extraction control means for controlling the
46 extraction means to extract a set of image data and a set of
47 corresponding control information indicated by the link
48 destination information included in the control information,
49 for reading the link destination information in the set of
50 control information stored in the storage means, and for
51 setting an extraction condition in the extraction means
52 based on an image data identifier of a set of image data of
53 a link destination to which switching has been indicated by
54 the indication receiving unit and a control information
55 identifier of a corresponding set of control information,

56 wherein each set of control information includes an

57 image data identifier of a set of image data of a link
58 destination and a control information identifier of a
59 corresponding set of control information as the link
60 destination information,

61 wherein the extraction means extracts a set of image
62 data and a set of control information indicated by the
63 extraction condition in the extraction means, and

64 , wherein the extraction control means includes an
65 extraction condition setting unit for setting image
66 correspondence table identification information found from
67 an image data identifier of a set of image data of the link
68 destination as the extraction condition.

1 33. The digital broadcast reception apparatus of Claim 32,
2 wherein the extraction control means further includes:

3 an image data extraction control unit for reading the
4 second image data identification information written in the
5 image correspondence table stored in the image
6 correspondence table storage unit, and setting the
7 extraction condition in the extraction means using the read
8 second image data identification information;

9 and wherein the extraction means further includes:

10 an image data extraction unit for extracting a set of
11 image data which matches the extraction condition set by the
12 image data extraction control unit.

1 34. The digital broadcast reception apparatus of Claim 33,
2 wherein the sets of image data are such that identical first
3 image data identification information have been repeatedly
4 assigned to different sets of image data,

5 and wherein the reproduction means includes:

6 an identifier extraction unit for extracting an image
7 data identifier included in the image data extracted by the
8 image data extraction unit, the image data identifier having
9 been written into a private area of the image data,

10 wherein the extraction control means further includes:

11 an image data judgement unit for judging whether the
12 image data identifier of the set of image data extracted by
13 the image data extraction unit matches the image data
14 identifier of the set of image data for the link destination
15 in the read link destination information;

16 a reproduction termination indicating unit for
17 sending, when the image data judgement unit judges that the
18 identifiers do not match, the reproduction means an
19 indication to terminate reproduction, with the reproduction
20 means terminating the reproduction on receiving the
21 indication; and

22 an image correspondence table extraction indicating
23 unit for indicating an extraction of an image correspondence
24 table to the image correspondence table extraction unit when
25 the reproduction termination indicating unit has sent a
26 reproduction termination indication.

35. The digital broadcasting reception apparatus of Claim 34, wherein the extraction control means further includes an extraction termination indicating unit for indicating a termination of an extraction of a set of image data by the image data extraction unit when the image data judgement unit judges that the identifiers match, with the image data extraction unit terminating the extraction on receiving the indication.

36. The digital broadcast reception apparatus of Claim 33, wherein each image correspondence table includes a reproduction start time for the corresponding set of image data,

wherein the reproduction means further includes:

a clock unit for measuring time,

wherein the reproduction means decodes and reproduces the extracted set of image data, in doing so notifying the extraction control means of a completion of decoding on completing a decoding of one set of image data,

wherein the extraction control means further includes:

a reproduction start time judgement unit for judging whether a notification of the completion of decoding has been received from the reproduction means before the reproduction start time of the set of image data written in the image correspondence table; and

17 an extraction indicating unit for indicating a
18 termination of an extraction of image data to the image data
19 extraction unit when the reproduction start time judgement
20 unit judges that no notification has been received, and for
21 indicating an extraction of an image correspondence table to
22 the image correspondence table extraction unit.

1 37. The digital broadcast reception apparatus of Claim 33,
2 wherein the first image data identification
3 information is a combination of a stream identifier
4 ("stream_id") and a packet identifier ("packet_id")
5 according to MPEG2 (Moving Pictures Experts Group2)
6 standard,

7 wherein the second image data identification
8 information is a combination of a stream identifier in
9 accordance with MPEG2 standard and a component tag
10 ("component_tag") in accordance with DVB (Digital Video
11 Broadcasting) standard, with a correspondence table for the
12 component tags and packet identifiers being multiplexed into
13 the multiplexed stream and repeatedly transmitted,

14 wherein the extraction means extracts the
15 correspondence table and the extraction control means refers
16 to the correspondence table, converts the second image data
17 identification information to the first image data
18 identification information, and sets the extraction
19 condition in the image data extraction unit.

1 38. The digital broadcasting reception apparatus of Claim
2 37, wherein the control information identification
3 information is a table identifier extension
4 ("table_id_extension"), in accordance with MPEG2 standard,
5 which has a same value as the control information
6 identifier.

1 39. The digital broadcasting reception apparatus of Claim
2 33, wherein the first image data identification information
3 and the second image data identification information are
4 identical, with the image data extraction control unit
5 setting the read second image data identification
6 information as the extraction condition in the extraction
7 means.

1 40. The digital broadcasting reception apparatus of Claim
2 33, wherein a reproduction end time of the corresponding set
3 of image data is written into the image correspondence
4 table,

5 wherein the reproduction means further includes a
6 clock unit for measuring time,

7 and wherein the extraction control means further
8 includes:

9 an end time judgement unit for judging whether the
10 reproduction end time written in the image correspondence

11 table has been reached; and
12 an extraction termination indicating unit for
13 indicating a termination of extraction of a set of image
14 data to the image data extraction unit, when the end time
15 judgement unit judges that the reproduction end time has
16 been reached.

1 41. A digital broadcast reception apparatus for receiving a
2 repeatedly transmitted digital broadcast of a plurality of
3 sets of image data and sets of control information which
4 correspond to the sets of image data, each set of control
5 information including link destination information showing a
6 set of image data which is a link destination for a link
7 attached to a set of image data corresponding to the set of
8 control information, each set of image data having first
9 image data identification information, each set of control
10 information having control information identification
11 information, the plurality of sets of image data and
12 corresponding sets of control information being multiplexed
13 into a multiplexed stream and transmitted, the multiplexed
14 stream including an image correspondence table for each set
15 of image data, each image correspondence table including
16 second image data identification information specifying a
17 corresponding set of image data, each image correspondence
18 table having identification information found from the image
19 data identifier of the set of image data, the image

20 correspondence tables being repeatedly transmitted in the
21 same way as the sets of image data,
22 the digital broadcast reception apparatus comprising:
23 reception means for receiving the digital broadcast;
24 extraction means for extracting one set of image data
25 and a corresponding set of control information from the
26 received digital broadcast,
27 the extraction means including an image correspondence
28 table extraction unit for extracting an image correspondence
29 table with image correspondence table identification
30 information which matches a set extraction condition, a
31 reproduction end time for a corresponding set of image data
32 being written in each image correspondence table;
33 an image data extraction unit for extracting sets of
34 image data which match the set extraction condition from the
35 multiplexed stream;
36 storage means for storing the extracted set of control
37 information,
38 the storage means including an image correspondence
39 table storage unit for storing the extracted image
40 correspondence table;
41 reproduction means for reproducing an extracted set of
42 image data, wherein the reproduction means includes a clock
43 unit for measuring time;
44 operation means for receiving user selection
45 operations for link destination information included in sets

46 of control information,
47 the operation means including an indication receiving
48 unit for receiving an indication for a switching from a set
49 of image data presently being reproduced to a set of image
50 data for a link destination; and
51 an extraction control means for controlling the
52 extraction means to extract a set of image data and a set of
53 corresponding control information indicated by the link
54 destination information included in the control information,
55 for reading the link destination information in the set of
56 control information stored in the storage means, and for
57 setting an extraction condition in the extraction means
58 based on an image data identifier of a set of image data of
59 a link destination to which switching has been indicated by
60 the indication receiving unit and a control information
61 identifier of a corresponding set of control information,
62 wherein each set of control information includes an
63 image data identifier of a set of image data of a link
64 destination and a control information identifier of a
65 corresponding set of control information as the link
66 destination information,
67 wherein the extraction means extracts a set of image
68 data and a set of control information indicated by the
69 extraction condition in the extraction means, and
70 wherein the extraction control means includes:
71 an extraction condition setting unit for setting image

72 correspondence table identification information found from
73 an image data identifier of a set of image data as the
74 extraction condition;

75 an end time judgement unit for judging whether the
76 reproduction end time of a set of image data which is
77 written in the image correspondence table has been reached;
78 and

79 an extraction state control unit for controlling the
80 image data extraction unit to extract sets of image data
81 which correspond to the extraction condition from the
82 multiplexed stream, for a time period from a setting of the
83 extraction condition by the extraction condition setting
84 unit to a point when the end time judgement unit judges that
85 the reproduction end time of the image data has been
86 reached.

1 42. A digital broadcast reception apparatus for receiving a
2 repeatedly transmitted digital broadcast of a plurality of
3 sets of image data, a plurality of sets of audio data and
4 sets of control information which each correspond to one set
5 of image data and one set of audio data, each set of control
6 information including link destination information showing a
7 set of image data and a set of audio data of a link
8 destination for a link attached to a set of image data
9 corresponding to the set of control information,

10 the digital broadcast reception apparatus comprising:

11 reception means for receiving the digital broadcast;
12 extraction means for extracting one set of image data,
13 one set of audio data and a corresponding set of control
14 information from the received digital broadcast;
15 storage means for storing the extracted set of control
16 information;
17 reproduction means for reproducing the extracted set
18 of image data and extracted set of audio data;
19 operation means for receiving a user selection
20 operation of link destination information included in the
21 set of control information; and
22 extraction control means for controlling the
23 extraction means to extract a set of image data, a set of
24 audio data, and a corresponding set of control information
25 which are indicated by the link destination information
26 selected by the user selection operation.

1 43. The digital broadcast reception apparatus of Claim 42,
2 wherein the operation means includes:
3 an indication reception unit for receiving an
4 operation indicating a switching from a currently displayed
5 set of image data to a set of image data for a link
6 destination,
7 the extraction control means reading the link
8 destination information in the set of control information
9 stored in the storage means, and setting an extraction

10 condition for the extraction means based on an image data
11 identifier for a set of image data of the link destination
12 to which switching has been indicated by the indication
13 reception unit, an audio data identifier for a corresponding
14 set of audio data, and a control information identifier for
15 a corresponding set of control information,

16 wherein each set of control information includes an
17 image data identifier for identifying a set of image data
18 for a link destination, an audio data identifier for
19 identifying a set of audio data for a link destination, and
20 a control information identifier for identifying a set of
21 control information for the link destination as the link
22 destination information,

23 and wherein the extraction means extracts a set of
24 image data, a set of audio data, and a set of control
25 information in accordance with the extraction condition set
26 by the extraction control means.

1 44. The digital broadcast reception apparatus of Claim 43,
2 wherein the multiplexed stream includes: an image
3 correspondence table for each set of image data, each image
4 correspondence table having image correspondence table
5 identification information found from the image data
6 identifier of the corresponding set of image data and each
7 image correspondence table including second image data
8 identification information for the corresponding set of

9 image data; and an audio correspondence table for each set
10 of audio data, each audio correspondence table having audio
11 correspondence table identification information found from
12 the audio data identifier of the corresponding set of audio
13 data and each audio correspondence table including second
14 audio data identification information for the corresponding
15 set of audio data, the image correspondence tables and audio
16 correspondence tables being multiplexed into the multiplexed
17 stream and repeatedly transmitted,

18 wherein the extraction control means includes:

19 an extraction condition setting unit for setting image
20 correspondence table identification information found from
21 an image data identifier of a set of image data and audio
22 correspondence table identification information found from
23 an audio data identifier of a set of audio data as the
24 extraction condition,

25 wherein the extraction means includes:

26 an image correspondence table extraction unit for
27 extracting an image correspondence table with image
28 correspondence table identification information which
29 matches the extraction condition set by the extraction
30 condition setting unit from the multiplexed stream; and

31 an audio correspondence table extraction unit for
32 extracting an audio correspondence table with audio
33 correspondence table identification information which
34 matches the extraction condition set by the extraction

35 condition setting unit from the multiplexed stream,
36 and wherein the storage means includes:
37 an image correspondence table storage unit for storing
38 the image correspondence table extracted by the image
39 correspondence table extraction unit; and
40 an audio correspondence table storage unit for storing
41 the audio correspondence table extracted by the audio
42 correspondence table extraction unit.

1 45. The digital broadcasting reception apparatus of Claim
2 44, wherein the extraction control means further includes:
3 an image data extraction control unit for reading the
4 second image data identification information written in the
5 image correspondence table stored in the image
6 correspondence table storage unit, and setting the
7 extraction condition in the extraction means using the read
8 second image data identification information;

9 an audio data extraction control unit for reading the
10 second audio data identification information written in the
11 audio correspondence table stored in the audio
12 correspondence table storage unit, and setting the
13 extraction condition in the extraction means using the read
14 second audio data identification information;

15 and wherein the extraction means further includes:

16 an image data extraction unit for extracting a set of
17 image data which matches the extraction condition set by the

18 image data extraction control unit; and
19 an image data extraction unit for extracting a set of
20 image data which matches the extraction condition set by the
21 image data extraction control unit.

1 46. The digital broadcast reception means of Claim 43,
2 wherein the plurality of sets of image data and plurality of
3 sets of corresponding control information are transmitted
4 having been multiplexed into a multiplexed stream,
5 wherein the reproduction means includes a
6 supplementary image reproduction unit for combining
7 supplementary image information included in the control
8 information stored in the storage means with a set of image
9 data and reproducing the combined image, wherein the
10 supplementary image information includes a supplementary
11 image which is used to select a switching of image data from
12 a present set of image data to a link destination set of
13 image data.

1 47. A digital broadcast reception apparatus for receiving a
2 repeatedly transmitted digital broadcast of a plurality of
3 sets of image data and sets of control information which
4 each correspond to one set of image data, each set of
5 control information including link destination information
6 showing a set of image data of a link destination for a link
7 attached to a set of image data corresponding to the set of

8 control information, each set of image data having first
9 image data identification information, each set of control
10 information having control information identification
11 information, the plurality of sets of image data and
12 corresponding sets of control information being multiplexed
13 into a multiplexed stream and transmitted, a plurality of
14 sets of module information, into which correspondence
15 between a plurality of image data identifiers and a
16 plurality of second image data identification information is
17 written, being multiplexed into the multiplexed stream,

18 the digital broadcast reception apparatus comprising:
19 reception means for receiving the digital broadcast;
20 extraction means for extracting one set of image data
21 and a corresponding set of control information from the
22 received digital broadcast,

23 the extraction means including a module information
24 extraction unit for extracting module information after an
25 extraction condition for module information has been set;

26 storage means for storing the extracted set of control
27 information,

28 the storage means including a module information
29 storage unit for storing the extracted module information;

30 reproduction means for reproducing an extracted set of
31 image data;

32 operation means for receiving user selection

33 operations for link destination information included in sets

34 of control information,

35 the operation means including an indication receiving
36 unit for receiving an indication for a switching from a set
37 of image data presently being reproduced to a set of image
38 data for a link destination; and

39 an extraction control means for controlling the
40 extraction means to extract a set of image data and a set of
41 corresponding control information indicated by the link
42 destination information included in the control information,
43 for reading the link destination information in the set of
44 control information stored in the storage means, and for
45 setting an extraction condition in the extraction means
46 based on an image data identifier of a set of image data of
47 a link destination to which switching has been indicated by
48 the indication receiving unit and a control information
49 identifier of a corresponding set of control information,

50 wherein each set of control information includes an
51 image data identifier of a set of image data of a link
52 destination and a control information identifier of a
53 corresponding set of control information as the link
54 destination information,

55 wherein the extraction means extracts a set of image
56 data and a set of control information indicated by the
57 extraction condition in the extraction means, and

58 wherein the extraction control means further includes
59 an image data identifier judgement unit for judging

60 whether there is an image data identifier, which matches an
61 image data identifier of the set of image data of the link
62 destination read from the link destination information, in
63 the module information stored in the module information
64 storage unit,

65 an image data extraction control unit for reading,
66 when the image data identifier judgement unit judges that a
67 matching image data identifier is present, second image data
68 identification information corresponding to the image data
69 identifier from the module information and for setting an
70 extraction condition for image data in the extraction means,
71 using the second image data identification information, and

72 a module information re-extraction indicating unit for
73 indicating an extraction of new module information to the
74 module information extraction unit when the image data
75 identifier judgement unit judges that a matching image data
76 identifier is not present,

77 wherein on receiving an indication from the module
78 information re-extraction indicating unit, the module
79 information extraction unit extracts new module information,
80 and updates the module information stored in the module
81 information storage unit, at which point the image data
82 identifier judgement unit performs a judgement for the
83 updated module information.

1 48. A digital broadcasting system, which achieves simulated

2 interaction using a digital broadcast, including a digital
3 broadcasting apparatus and a digital reception apparatus,

4 wherein the digital broadcasting apparatus comprises:

5 image information storage means for storing a
6 plurality of sets of image data, each of which has an image
7 data identifier;

8 control information storage means for storing a
9 plurality of sets of control information, each of which has
10 a control information identifier, and each of which includes
11 link destination information that shows a set of image data
12 and a set of control information for a link destination for
13 a corresponding set of image data; and

14 transmission means for repeatedly transmitting a
15 plurality of sets of the image data and a plurality of sets
16 of the control information,

17 and wherein the digital reception apparatus comprises:

18 reception means for receiving the digital broadcast;

19 extraction means for extracting one set of image data
20 and a corresponding set of control information from the
21 received digital broadcast;

22 storage means for storing the extracted set of control
23 information;

24 reproduction means for reproducing the extracted set
25 of image data;

26 operation means for receiving a user selection
27 operation of link destination information included in the

28 set of control information; and
29 extraction control means for controlling the
30 extraction means to extract a set of image data and a
31 corresponding set of control information which are indicated
32 by the link destination information selected by the user
33 selection operation.

1 49., A digital broadcasting system, which achieves simulated
2 interaction using a digital broadcast, including a digital
3 broadcasting apparatus and a digital reception apparatus,
4 wherein the digital broadcasting apparatus comprises:
5 image information storage means for storing a
6 plurality of sets of image data, each of which has an image
7 data identifier;
8 control information storage means for storing a
9 plurality of sets of control information, each of which has
10 a control information identifier, and each of which includes
11 link destination information that shows a set of image data
12 and a set of control information for a link destination for
13 a corresponding set of image data, the link destination
14 information being a combination of an image data identifier
15 for the set of image data of the link destination and a
16 control information identifier for the set of control
17 information for the link destination;
18 correspondence information storage means for storing
19 correspondence information showing correspondence between

20 the sets of image data and the sets of control information;
21 and
22 multiplexing transmission means for reading a set of
23 image data and a corresponding set of control information
24 given in the correspondence information, and for repeatedly
25 transmitting the read set of image data and the read set of
26 control information as a multiplexed stream, having assigned
27 image data identification information and written the image
28 data identification information into the image data, and
29 having assigned control information identification
30 information and written the control information
31 identification information into the control data,
32 wherein the digital broadcast reception means
33 comprises:
34 reception means for receiving the digital broadcast;
35 extraction means for extracting one set of image data
36 and a corresponding set of control information from the
37 received digital broadcast;
38 storage means for storing the extracted set of control
39 information;
40 reproduction means for reproducing the extracted set
41 of image data;
42 operation means for receiving a user selection
43 operation of link destination information included in the
44 set of control information; and
45 extraction control means for controlling the

46 extraction means to extract a set of image data and a
47 corresponding set of control information which are indicated
48 by the link destination information selected by the user
49 selection operation.

1 50. A recording medium for use by a reception apparatus,
2 the reception apparatus including: reception means which
3 receives a repeatedly transmitted digital broadcast of a
4 plurality of sets of image data and sets of control
5 information which correspond to the sets of image data, each
6 set of control information including link destination
7 information showing a set of image data which is a link
8 destination for a link attached to a set of image data
9 corresponding to the set of control information; extraction
10 means for extracting one set of image data and a
11 corresponding set of control information from the received
12 digital broadcast; storage means for storing the extracted
13 set of control information; reproduction means for
14 reproducing the extracted set of image data; operation means
15 for receiving a user operation; and program execution means
16 for executing a program recorded on the recording medium,
17 the program including the following steps:
18 a selection operation judgement step for judging a
19 user selection operation for link destination information
20 included in a set of control information; and
21 an extraction control step for controlling the

22 extraction means to extract a set of image data and a
23 corresponding set of control information indicated by link
24 destination information selected by the user.